Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** M **Date:** 10-11-22 **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	**Revision Nbr**								
D407-667-145	Rev C								
100		0.00							
DC	DOCUMENT CONTROL								
Document Control	**Memo**	0.00							
	Photocopy bluefile and create labels as per PPP D407-667-105 CHG003								
110		0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							
120		0.00							
CNC Bend 2	BENDING MACHINE - CROSSTUBES								
CNC Alpha 160 Bender	**Memo**	0.00							
	Bend tube as per Dwg D407-667-145 using CNC bender program 407-fw								

D407 667 105 B63984

Sholly

for MF 11/01/13

DP 11-1-5

DP 11-1-5

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
QC	**Memo**	0.00 11/10/05							
Quality Control									

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start**

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____ **Stop**

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
140	Crosstubes	0.00							
Crosstubes		0.00							

Crosstubes

Memo

1- scrib batch # inside of cuff

2-Drill pilot holes in tube using drill Jig DT8541 & DT8542 as per Dwg D407-667-145. Drill all (3) top holes use drill table jig DT8577 hole #1, #11 to set up towers, as per QSI0010.

3-Drill and Ream all holes in tube to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145 Check dimensions between holes on all four sides.

4-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

5-Drill pilot holes using drill Jig DT8541 & DT8542 as per Dwg 407-667-145. Drill only the top (2) holes.

6-Drill & ream the top (2) holes to finish size using drill Jig DT8541 & DT8542 as per Dwg D407-667-145

7-Drill Fwd rivet holes using drill Jig DT8787FWD as per Dwg D206-667-145.Note: Fwd side has 3x top holes.

8-Drill Aft rivet holes using drill Jig DT8787AFT as per Dwg D407-667-145.

9-C'sink holes as per Dwg D407-667-145. Allow rivet to sit below surface to compensate for paint.

10 -Deburr & Inspect for surface damage. Repair damage within limits as per

SDD BE 11/01/06

DP 11-1-6

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Fwd

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Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
	Dwg D407-667-145								
150 HandFXtube	Crosstubes Chemical Conversion	0.00				1	Ø		11/01/06
Hand Finishing Crosstubes	**Memo**	0.00							
160 QC	QC3- Inspect Part Finish	0.00							
Quality Control	**Memo**	0.00							
170 QC	QC5- Inspect part completeness to step on W/O	0.00							
Quality Control	**Memo**	0.00							

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 63984

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Item ID: D407-667-105 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180	Outsource process - NDT per QSI038 4.1	0.00							
Outsource2	**Memo**	0.00							
Outsource process - NDT	OUTSIDE SERVICE -CROSSTUBES Liquid Penetrant Inspection as per QSI 038 Or Issue P/O: 13250 LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order								
190		0.00							
Packaging	Packaging								
Packaging	**Memo**	0.00							
	Inspect for transit damage Ensure copy of NDT results attached to work order.								
200	QC5- Inspect part completeness to step on W/O	0.00							
QC	**Memo**	0.00							
Quality Control	Inspect for damage & ensure results are as per Dwg D206-667-145								

CL 11/01/10 (1)

11/2/10 (1)

KK 11-01-11

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start**

Revision ID: **Stop**

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	SprayPaint	0.00							
SprayPaint						AT	11	01-11	
Spray Painting	**Memo**	0.00							

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:
Start Time: 11:00
Fininsh Time: 12:00

PAINT:
Start Time: 3:00
Finish Time: 4:00

220	QC14- Inspect Spray Paint	0.00							
QC						MA	11	01	12
Quality Control	**Memo**	0.00							

Then,Wrap in plastic bag to protect from scratches

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item ID: D407-667-105 **Accept** **Setup Start** **Stop**
Revision ID:
Item Name: Crosstube Fwd
Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**
Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**
Reference:

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____ **Run Start** **Stop**
QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230		0.00				MN	11	01	12(1)
Crosstubes	Crosstubes								
Crosstubes	**Memo**	0.00							
	1-Install support using 0.03" to 0.06" thick layer of magnobond 6398 per QSI 015. Let cure for 12h after installation and prior to packaging. Note: (3) top holes should be facing up. A/R Magnobond 6398 : 115580 exp: 07/2011								
	MN 11-01-13 2-Torque clamps to 80-100 in lb								
	3-Install nut plates as per Dwg D407-667-145. Touch-up rivet heads with Imron paint.								
240	QC5- Inspect part completeness to step on W/O	0.00				(X)			
QC									
Quality Control	**Memo**	0.00							

S 11/01/13

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start** **Stop**

Revision ID:

Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Start Qty:** 1.00 **Cust Item ID:**

Required Date: 11/30/2010 **Req'd Qty:** 1.00 **Customer:**

Reference:

Run Start **Stop**

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
250 Packaging Packaging	Pick Kit	0.00				11/1/14 SP			
	Memo	0.00							
260 QC Quality Control	QC4- 100% Inspect kits for completeness	0.00				40			
	Memo	0.00							
270 Packaging Packaging	Packaging	0.00				11/10/14 (1)			
	Memo	0.00							

Identify and pack for shipping as per PPP D407-667-105
Location: S3
PPP Rev: C

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W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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NOTE: Date & initial all entries

Work Order ID 63984

Monday, November 22, 2010 2:50:55 PM

Item ID: D407-667-105 **Accept** **Setup Start**

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Reference:

Run Start

Stop

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

QC: _____ **Date:** _____ **SPC (Y/N):** _____ **Date:** _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
280	QC21- Final Inspection - Work Order Release	0.00					11/01/14		
QC	**Memo**	0.00							
Quality Control									

11-01-14

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

Monday, November 22, 2010 2:51:00 PM

Work Order ID: 63984

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Required Date:** 11/30/2010

Start Qty: 1.00 **Required Qty:** 1.00

Comments: IPP Rev:F□05.09.01□Add holes for compatibility with Bell Skidtubes□KJ/JLM
IPP Rev:G 08-05-16 chg QC6 to QC15 DD verified by:EC
IPP Rev:H 08-06-03 update as per DSI9415 (ECN1198) DD verified by:ec
IPP Rev:I 08-07-14 add (scribe inside of tube) seq.6 DD verified by:EC
IPP Rev:J 08-07-28 update as per (par 08-013) DD verified by:EC
IPP Rev K 09.01.06 ECN 08-562 EC verified by:DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-105TRN Crosstube Turning Detail		Manufactured	No			110	Each	2.0000	1	1			

Location	Loc Qty	Loc Code
LG	2	
61509	1	
61510	1	

D2873-043 Nut Plate Assembly		Manufactured	No			230	Each	32.0000	2	2			

Location	Loc Qty	Loc Code
LG	30	
62380	10	
63497	20	
ST	2	
60981	2	

D2873-045 Nut Plate Assembly		Manufactured	No			230	Each	30.0000	2	2			

Location	Loc Qty	Loc Code
LG	30	
60982	4	
62378	6	
63498	20	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Picklist Print

Monday, November 22, 2010 2:51:00 PM

Work Order ID: 63984

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Required Date:** 11/30/2010

Start Qty: 1.00 **Required Qty:** 1.00

D2891-1	Manufactured	No		230	Each	51.0000	2	2 11-01-12

2.25 Support

Location	Loc Qty	Loc Code	
LG	51		
46159	1		
50952	18		
53773	20		
62595	12		

D3595-063-395	Manufactured	No		230	Each	75.0000	4	4 11-01-12

RUBBER CUSHION

Location	Loc Qty	Loc Code	
FP	10		
44667	10		
ST	65		
63368	65		

MS20601-AD4W10	Purchased	No		230	Each	176.0000	14	14 11-01-13

RIVET

Location	Loc Qty	Loc Code	
LG051	176		
114245	2		
115405	2		
115881	72		
116186	100		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Picklist Print

Monday, November 22, 2010 2:51:00 PM

Work Order ID: 63984

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Required Date:** 11/30/2010

Start Qty: 1.00 **Required Qty:** 1.00

MS21920-20	Purchased	No		230	Each	57.0000	4	4 11.01.12
Clamp (per MIL-DTL-8783C)								

Location	Loc Qty	Loc Code
LG	57	
112624	2	
114687	1	
115057	4	
115736	50	

AN5-10A	Purchased	No		250	Each	252.0000	10	10 11/1/14
Bolt								

Location	Loc Qty	Loc Code
ST337	252	
115429	15	
115589	100	4
115700	137	6

AN5-30A	Purchased	No		250	Each	100.0000	4	4 11/1/14 SP
BOLT								

Location	Loc Qty	Loc Code
ST339	100	
114941	50	4
116003	50	

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

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Picklist Print

Monday, November 22, 2010 2:51:00 PM

Work Order ID: 63984

Parent Item: D407-667-105

Parent Item Name: Crosstube Fwd

Start Date: 11/22/2010 **Required Date:** 11/30/2010

Start Qty: 1.00 **Required Qty:** 1.00

AN5-32A		Purchased	No		250	Each	250.0000	4	4 11/1/14 SP
Bolt									

Location	Loc Qty	Loc Code	
ST340	250		
114405	40		4
115016	50		
115108	50		
115589	60		
115698	50		

AN960JD516	NAS1149D0563J	Purchased	No		250	Each	34.0000	18	18 M114742 11/1/14 SP
Washer									

Location	Loc Qty	Loc Code	
ST	34		
103694	18		
107534	12		
109287	4		

MS21042L5		Purchased	No		250	Each	1,363.000	4	4 11/1/14 SP
Nut									

Location	Loc Qty	Loc Code	
ST139	26		
114813	26		
ST300	1337		
115156	137		
115594	500		
116104	200		4
116105	500		

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
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Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

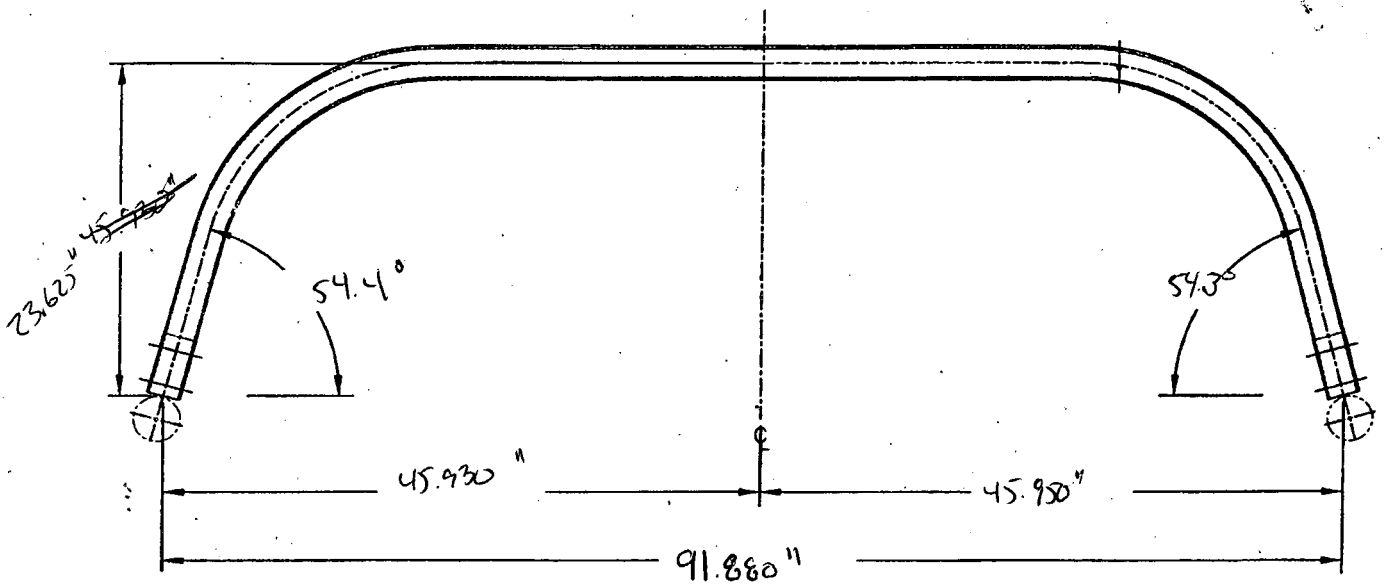
Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	63984
Description: Crosstube High Fwd (407)	Part Number:	D407-667-105
Inspection Dwg: D407-667-145 **Rev:** C		Page 1 of 1

Required Dimension	Min	Max
Height	23.41	23.67
1/2 Span	45.81	46.07
Angle	54	56
Total Span	91.63	92.13



Comments

QC15 Inspection	S
Date	~~11-07-05~~ 11/a/05

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.11.12	Dimensions updated per Dwg Rev C	KJ	

45.950
45.930
91.880

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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DATE	**STEP**	**Description of NC** Section A	**Corrective Action** Section B			**Verification** Section C	**Approval** Chief Eng	**Approval** QC Inspector
			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

Item	Qty -145	Part Number	Description
1	X	D407-667-145	CROSSTUBE ASSEMBLY (407 HIGH FWD)
2	1	D6010-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 63984

BJ 10-11-22

GENERAL NOTES:

1) MATERIAL: MANUFACTURED FROM D6010-115
 FINISHED LENGTH = 113.20±0.020
2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
 PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
 PAINT OUTSIDE PER DART QSI 005 4.2
3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
4) UNITS: INCHES UNLESS OTHERWISE NOTED.
5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-145" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
7) WEIGHT: 17.8 lbs
8) PART IS SYMMETRIC ABOUT CENTERLINE.
9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED 09/11/12

REV.	DESCRIPTION	BY	DATE
C	REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. 7 ADD TOLERANCES (ZN C6-3, C4-3, D2-3); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES AND NUT PLATES FOR COMPATABILITY WITH BHT/AA SKUDTUBES	PH	05.07.26
A	NEW ISSUE	CP	02.05.08

DESIGN	GP	**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED	GP	DRAWING NO. D407-667-145 REV. C SHEET 1 OF 4
MFG. APPR.		
APPROVED		TITLE CROSSTUBE ASS'Y (407 HIGH FWD) SCALE NTS
DE APPR.		
DATE	08.11.06	

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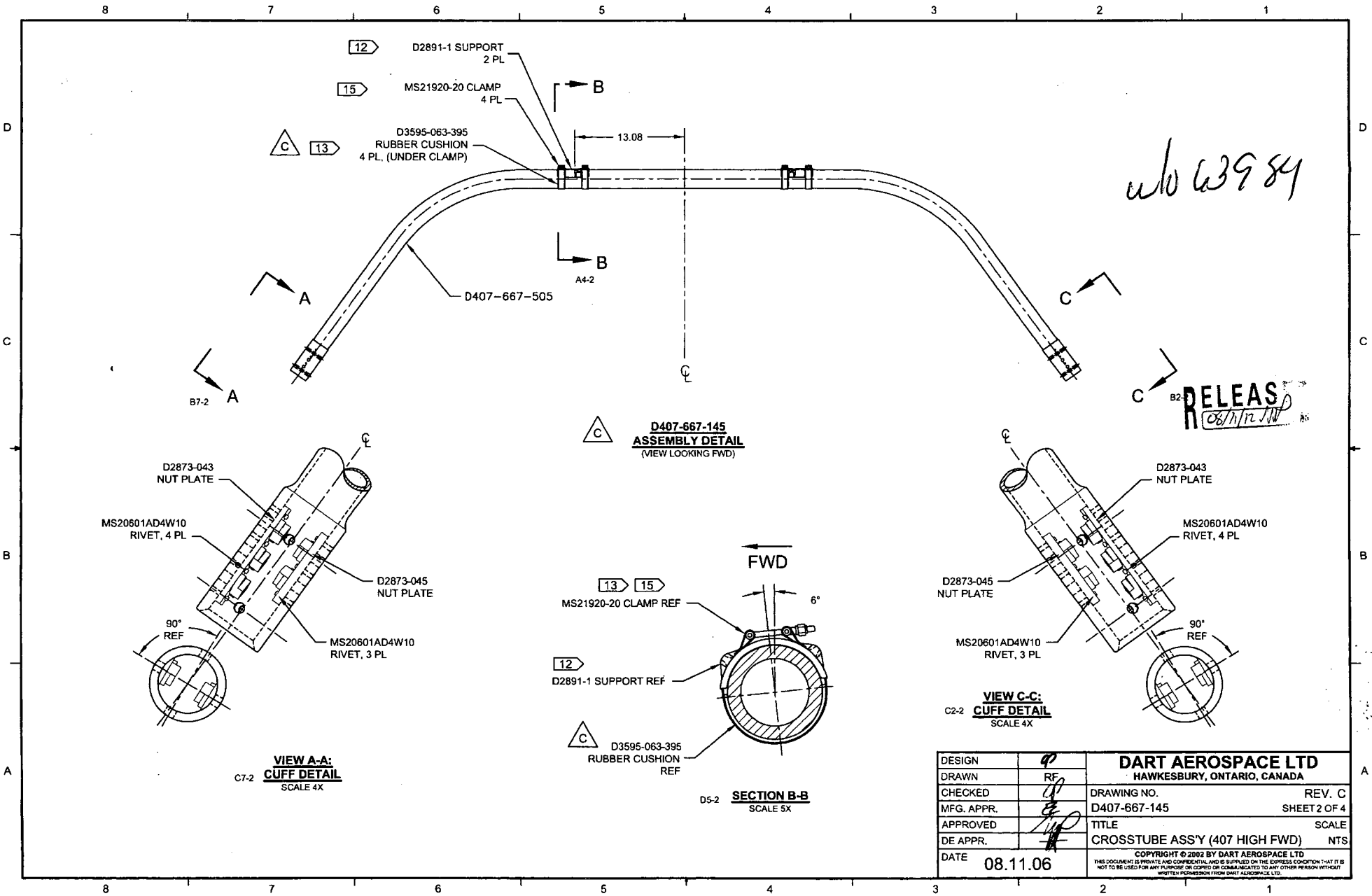
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

Part No: _____ **PAR #:** _____ **Fault Category:** _____ **NCR:** Yes No **DQA:** _____ **Date:** _____

Resolution: _____ **Disposition:** _____ **QA: N/C Closed:** _____ **Date:** _____

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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries



w/o 63984

RELEASED 08/11/22 NP

DESIGN		DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. C
MFG. APPR.		D407-667-145	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (407 HIGH FWD)	NTS
DATE	08.11.06		

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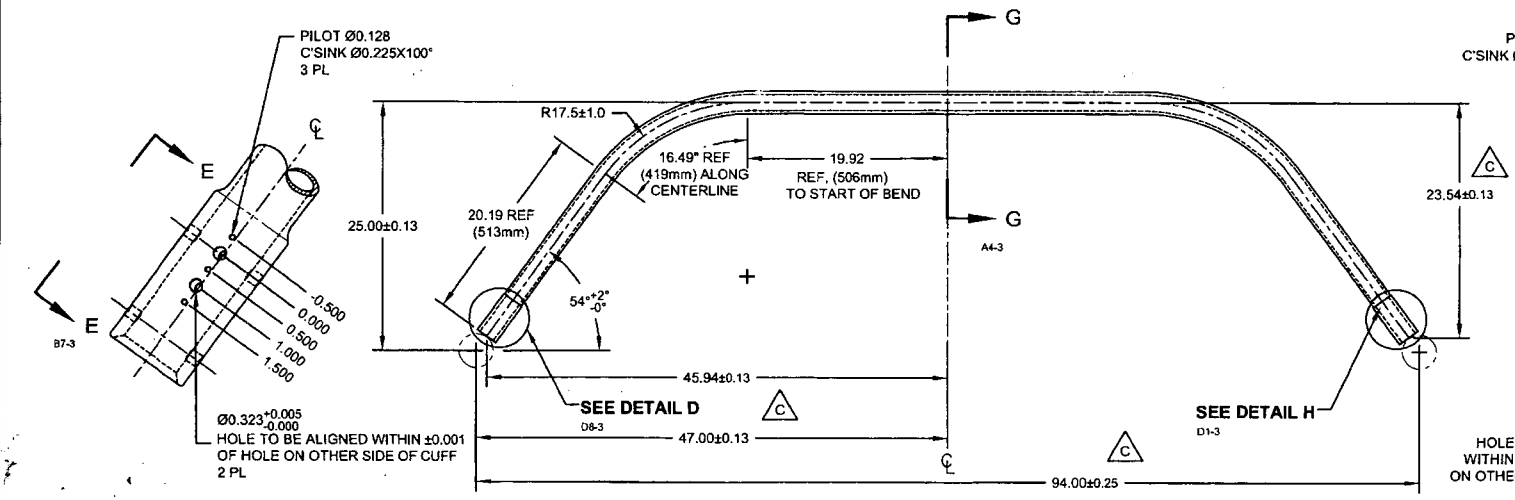
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			Initial Chief Eng	**Action Description** Chief Eng	**Sign & Date**			

NOTE: Date & initial all entries

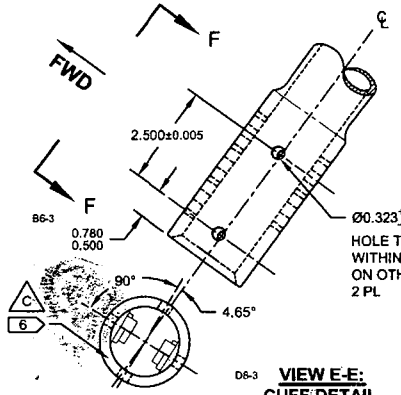
w/o 43984



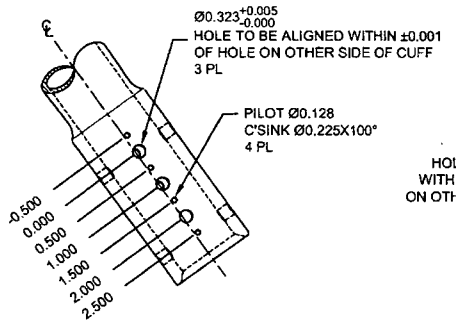
C6-3 **DETAIL D**
SCALE 4X
(VIEW LOOKING FWD)

C3-3 **DETAIL H**
SCALE 4X
(VIEW LOOKING FWD)

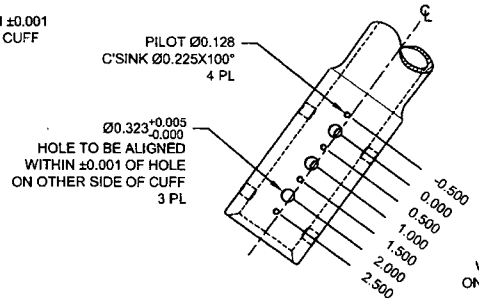
D407-667-505
BENDING AND DRILLING DETAIL
(VIEW LOOKING FWD)



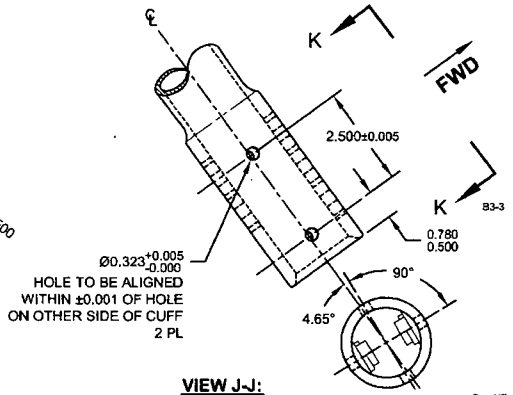
D6-3 **VIEW E-E:**
CUFF DETAIL
SCALE 4X



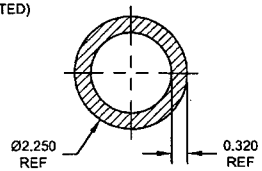
B7-3 **VIEW F-F**
(VIEW LOOKING AFT, ROTATED)



B2-3 **VIEW K-K**
(VIEW LOOKING AFT, ROTATED)



D1-3 **VIEW J-J:**
CUFF DETAIL
SCALE 4X



D4-3 **SECTION G-G**
SCALE 5X

RELEASED
04/11/12 MD

DESIGN		**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D407-667-145 REV. C SHEET 3 OF 4
MFG. APPR.		
APPROVED		TITLE CROSSTUBE ASS'Y (407 HIGH FWD) SCALE NTS
DE APPR.		
DATE 08.11.06		

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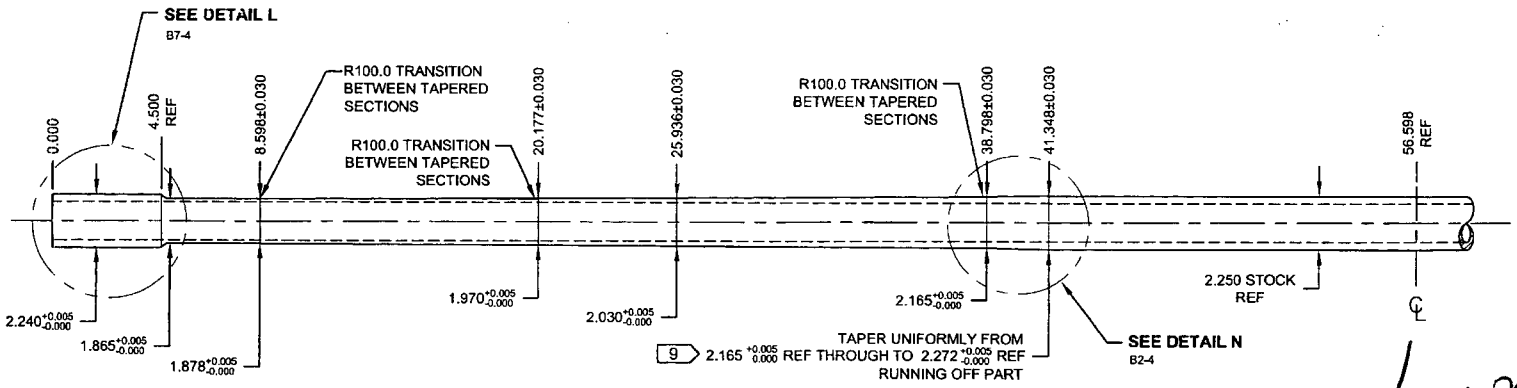
W/O:		WORK ORDER CHANGES					
DATE	**STEP**	**PROCEDURE CHANGE**	**By**	**Date**	**Qty**	**Approval** Chief Eng / Prod Mgr	**Approval** QC Inspector

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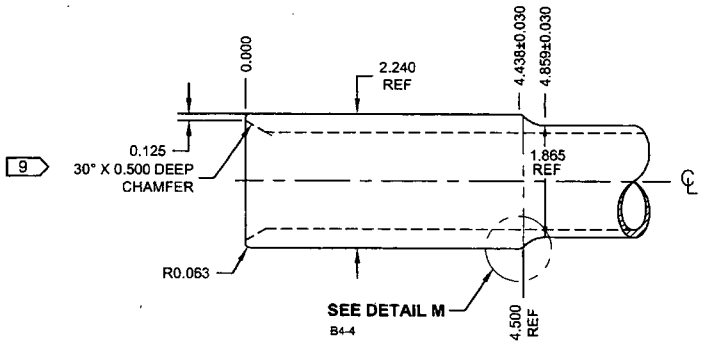
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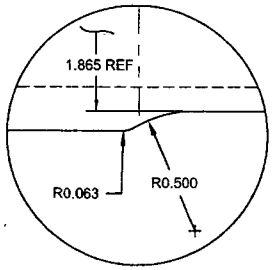


w/o 63984

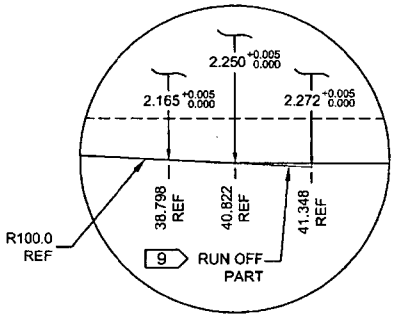
C TURNING DETAIL



DETAIL L:
D7-4 **CROSSTUBE CUFF**
NOT TO SCALE



DETAIL M:
B6-4 **CUFF TRANSITION**
NOT TO SCALE



DETAIL N:
C3-4 **TAPER RUN-OFF**
NOT TO SCALE

RELEASED
08/11/06

DESIGN		**DART AEROSPACE LTD** HAWKESBURY, ONTARIO, CANADA
DRAWN	RF	
CHECKED		DRAWING NO. D407-667-145 — REV. C — SHEET 4 OF 4
MFG. APPR.		
APPROVED		TITLE: CROSSTUBE ASS'Y (407 HIGH FWD) — SCALE: NTS
DE APPR.		
DATE	08.11.06	

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LIQUID PENETRANT TEST REPORT

P- 15201

ACUREN

PAGE 1 OF 1

CLIENT	DART AEROSPACE	DATE	FEB. 10, 2011 TIME AM ☑ PM ☐
ATTENTION	LINDA LACELLE	ACUREN JOB NO.	188-11-7008
ADDRESS	127 AREVIEW ST	PO/WO NO.	—
	HAWKESBURY, ON.	WORK LOCATION	HAWKESBURY PLANT
		ACCEPTANCE STD.	ASTM 1417 REV./DATE 2005
PROJECT	F.P.I.		
ITEM(S) EXAMINED	6	CROSS TUBES.	
	2	ENGINE MOUNTS	

JOB DESCRIPTION	PROCEDURE NO. LT-002 REV./DATE 2008	TECHNIQUE NO. LT-TECH 2 REV./DATE 2008
PART NO.	—	MATERIAL ENGINE ALUMINUM THICKNESS VARIOUS
SCOPE	WET FLUORESCENT LIQUID PENETRANT INSPECTION CARRIED OUT 100% EXTERNAL	

TEST DETAILS

METHOD	☑ FLUORESCENT ☐ VISIBLE			☑ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED	
FAMILY BRAND	MAGNAFLUX			BLACK LIGHT S/N 10454 ☐ OUTPUT > 1000 μ W/CM² ☐ AMBIENT < 2 fc	
PENETRANT	ZL67	MINIMUM DWELL TIME	45 10 MIN.	LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT>100 fc @ SURFACE	
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10 MIN.	OTHER LAB. NO	
DEVELOPER	SD52	MINIMUM DWELL TIME	10 MIN.	LIGHT METER S/N 10988606	CAL DUE DATE oct-14-2011
DEVELOPER TYPE	☑ NON AQUEOUS ☐ AQUEOUS	☐ DRY			

TEST SURFACE

SURFACE CONDITION	☐ AS GROUND	☐ AS WELDED	☐ MACHINED	☐ SHOT BLASTED	☐ CLEAN BARE METAL
SURFACE TEMPERATURE	☐ < - 4°C/ 20°F	☐ - 4°C/ 20°F TO 10°C/50°F		☐ 10°C/50°F TO 52°C/125°F	☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

1	CROSS TUBE - W.O. 63984	✓	except reject
1	CROSS TUBE - W.O. 63984	✓	
1	CROSS TUBE - W.O. 63524	✓	
1	CROSS TUBE - W.O. 63524	✓	
1	CROSS TUBE - W.O. 64541	✓	
1	CROSS TUBE - W.O. 64547	✓	
1	ENGINE MOUNT ASSEMBLY W.O. 63456-D3687-1	✓	
1	MOUNT D3687-3	✓	

RT 10-01-11

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE	Dan Titley (PRINT)	(SIGNATURE)	DTR # E03740
TECHNICIAN (SIGNATURE):			REPORT REVIEWED BY:
NAME (PRINT):	Mike Johnston (1ST TECHNICIAN)	(2ND TECHNICIAN)	NAME / INITIALS
CGSB LEVEL	2 SNT LEVEL —	CGSB LEVEL — SNT LEVEL —	
CGSB REG. NO	6666	CGSB REG. NO	

WHITE – CLIENT COPY CANARY – OFFICE COPY PINK – TECHNICIAN COPY GOLD – OFFICE COPY